REMARKS/ARGUMENTS

Claims 1-47 are currently pending in this application.

By way of this amendment, claims 1, 11, 14-19, 21, 22, 26, 39, 42, 43, 46, and 47 have been amended; claims 2-6, 30-38 and 41 have been cancelled without prejudice; and claims 48 and 49 have been added.

Claims 42 and 44 currently stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,825,734 to Clark.

The Clark patent discloses a voltage controlled oscillator module or circuit where the resonator is defined by two embodiments: 1) transmission microstrip lines printed onto the top surface of the dielectric substrate material; or 2) transmission strip lines contained and embedded within the dielectric substrate material. In both embodiments, at least one portion or segment of the transmission line defines a loop or multiple loops which can terminate in a center capacitive area adapted to be tuned by well known methods such as, for example, laser trimming or physical abrasion.

The present invention, on the other hand, is a frequency translation module or circuit (not a voltage controlled oscillator module or circuit as in the Clark patent) which includes separate resonator and impedance network devices. The module disclosed in the Clark patent, on the other hand, defines only a resonator. No separate impedance network or device is disclosed or suggested in the Clark patent.

More specifically, in the present invention, the impedance network is defined by a plurality of strips of wiring formed on the circuit board while the resonator is a separate device such as, for example, a surface-acoustic wave device adapted to be secured to the surface of the circuit board.

Independent method claim 42, both as originally drafted and now additionally as presently amended, is not anticipated by the Clark patent. The rejection is thus traversed and should be withdrawn for the reasons noted in more detail below.

Independent method claim 42 initially recites a method for fabricating a frequency translator circuit, as opposed to the Clark patent which discloses only a voltage controlled oscillator circuit.

Independent method claim 42 has additionally been amended to recite a resonator device adapted to be coupled to the circuit board as opposed to the Clark patent where the resonator is defined by strips of wiring formed on the circuit board itself. This amendment does not introduce any new matter and is supported, for example, in FIG. 9 and the specification at page 10, lines 22-25 which in combination describe and depict a resonator 140 as a separate surface-acoustic wave device adapted to be coupled to the top of the circuit board.

Independent method claim 42 has still further been amended to recite that the frequency translator circuit comprises a separate impedance network including a plurality of passive devices and an electrically conductive lead associated with each of the passive devices. This amendment does not introduce any new matter and is supported in, for example, FIG. 4 and the description at page 9, lines 22-24 which in combination describe and depict an impedance network 142 including passive devices 146 and electrically conductive leads 148 associated with each of the passive devices 146.

As described above, the oscillator circuit disclosed in the Clark patent defines only a resonator circuit. No separate impedance network or circuit is disclosed therein let alone a separate impedance circuit including a plurality of passive devices.

Claim 42 further recites that a compliant material positioned between the resonator and the circuit board is used to secure the resonator to the circuit board.

Initially, and as described above, the resonator of the oscillator module disclosed in the Clark patent is defined by strips of wiring defined on or embedded within the surface of an integrated circuit substrate rather than a separate device adapted to be coupled to a circuit board. As such, there is no need for, and thus no disclosure of, any separate compliant securing material.

Claim 42 has further been amended to recite that the compliant material has a Young's Modulus which is less than the Young's Modulus of the material of the circuit board.

This amendment does not introduce any new matter and is supported in FIG. 9 and the description on page 15, lines 9-28 to page 16, lines 1-2 which describes the use of a compliant material 170 for securing the resonator 140 to the circuit board 152.

In accordance with the present invention, the compliant material preferably has a Young's Modulus of Elasticity which is considerably less than the other currently available means for securing a device to a circuit board (such as lead-based solder) for the purpose and intent of improving the microphonic (i.e., shock-absorbing) characteristics of the frequency translator. Silicon (the standard material from which integrated circuit substrates are made) has a Young's Modulus of 188 GPa. Typical lead-based solder used to attach devices to the face of circuit boards has a Young's Modulus of about 32 GPa. The compliant materials contemplated by the present invention including silicone all have a Young's Modulus of less than 1 GPa, and are preferably below 0.56 GPa.

The Examiner has relied on the Clark patent for the teaching therein of a resonator substrate made of a compliant material and to the Mucke patent for the teaching therein of an integrated circuit substrate made of silicon.

However, and as explained above, the present invention is not directed to the "silicon" material from which the substrate or circuit board itself is made but rather to the compliant/shock-absorbing "silicone" material intended to secure and hold the resonator to the circuit board. Applicants have sought to highlight the existence of, and difference between, these two separate elements by amending claim 42 to recite that the circuit board and compliant material have different Young's Moduli.

Independent claim 42 still further recites the steps of providing a reference frequency to the frequency translator circuit and observing an output frequency generated by the frequency translator circuit. As described above, the Clark patent does not disclose or suggest a frequency translator circuit, and thus cannot and does not disclose or suggest the recited steps above.

Independent claim 42 has still further been amended to recite the step of short-circuiting at least a portion of one or more of the plurality of passive devices by severing one or more of the respective electrically conductive leads associated with each of the passive devices.

This amendment does not introduce any new matter and is supported in, for example, FIG. 7 and the specification on page 10, lines 3-22.

The Clark patent discloses only the use of laser trimming to change the shape of a capacitive plate (column 7, lines 1-16). It does not disclose or suggest the use of laser trimming to sever a conductive lead associated with a passive device as recited in claim 42.

Dependent claims 43 and 45-47 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Clark patent in view of U.S. Patent No. 6,268,778 to Mucke et al. ("the Mucke patent"). Claim 44 stands rejected under 35 U.S.C. § 102(e) as being anticipated by the Clark patent.

The rejection of dependent claims 43-47 is respectfully traversed and should be withdrawn inasmuch as claims 43-47, being dependent upon allowable independent claim 42 as presently amended, are allowable for the same reasons as independent claim 42.

Moreover, and as described above with respect to claim 42, the reference in claims 42-47 to the term "compliant material" is not to the material from which the substrate/printed circuit board is made but rather, and as recited in independent claim 42, to the separate compliant material which is positioned between the resonator and the circuit board and is used to secure the resonator to the circuit board.

Claim 43 recites that the compliant material is silicone. Neither Clark nor Mucke disclose or suggest the use of a compliant material on either the resonator substrate (Clark) or the integrated circuit substrate (Mucke) for shock-absorbing reasons. Moreover, the teaching in Mucke is to the use of an integrated circuit substrate made of silicon (not silicone). This is of particular significance inasmuch as "silicon" has a Young's Modulus of 188 GPa while "silicone" has a Young's Modulus of .75 GPa.

Dependent claims 48 and 49 have been added to more particularly describe the structure of the impedance network and, more particularly, the passive devices and conductive leads defining the same.

Claims 48 and 49 do not introduce any new matter and are supported via the combination of FIG. 7 and the description on page 9, lines 22-28; page 10, lines 1-25; page 11, lines 1-5; page 12, lines 10-25; and page 13, lines 4-17.

None of the cited references disclose or suggest the use of an impedance network let alone an impedance network incorporating the elements and features

recited in newly added claims 48 and 49. See, for example, FIG. 7 which depicts a plurality of conductive leads 148 which together define a generally square-shaped central loop and plurality of outer passive devices 146, each defining a curved segment of wiring which loops about a selected one of the conductive leads 148 and includes opposed ends terminating into the selected one of the conductive leads 148. In accordance with the present invention, the conductive leads 148 can be severed at any one of the points 1, 2 or 3 for example for terminating or degrading the flow of electrical current through the leads to obtain the desired resonant frequency.

Claims 1, 3, 7-21, 23, and 27-40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Clark patent in view of U.S. Published Patent Application No. US2004/0232995 to Thomsen et al. ("the Thomsen patent publication").

Claims 2, 4-6, 22, and 24-26 stand rejected under § 103(a) as being unpatentable over the Clark patent in view of the Thomsen patent publication and further in view of the Mucke patent.

These rejections are respectfully traversed and should be withdrawn for the reasons discussed in more detail below.

Independent claim 1 initially recites a frequency translator. As described above, the Clark patent discloses only a voltage controlled oscillator.

Claim 1 further recites that the frequency translator comprises a resonator in the form of a surface-acoustic wave device. The Clark patent discloses only a resonator defined by lines printed onto or embedded into the resonator substrate, not a SAW device which, as recited in claim 1 as presently amended, is a separate device adapted to be mounted and secured to a circuit board.

Moreover, and although the Thomsen patent publication discloses the use of a SAW device, there is no teaching or suggestion in either of the Clark or Thomsen patent references that it would have been obvious to substitute the embedded stripline/microstrip type resonator disclosed in Clark with the SAW device disclosed in Thomsen.

Independent claim 1 additionally recites that an impedance network is operably coupled to the resonator. Claim 1 has been amended to recite that the impedance network comprises a plurality of passive devices and a conductive lead associated with

each of the passive devices. Claim 1 has still further been amended to recite that one or more of the leads are severable to define one or more severed conductive leads whereby the impedance of the impedance network is increased by the inductance of the respective passive device associated with the severed lead.

These amendments do not introduce any new matter and are supported in, for example, FIG. 7 and the specification on page 9, lines 22-24 and page 10, lines 13-21.

Initially, Applicants note that the Clark patent teaches only a resonator, not the combination of a resonator with a separate impedance network. Moreover, and even if the resonator disclosed in the Clark patent could also be considered to be an impedance network, it is noted that resonator 105 disclosed in the Clark patent and shown in, for example, FIG. 1a thereof comprises only a single passive device (in the form of capacitive termination 103) and only a single conductive lead (in the form of looped-stub resonator 105). Claim 1, on the other hand, recites a plurality of passive devices and conductive leads.

Still further, the Clark patent fails to teach or suggest severing any portion of the strip 105 but rather teaches only the trimming or abrasion of the plate defining the termination 103. As a matter of fact, the Clark patent could not teach or suggest severing any portion of the resonator strip 103 inasmuch as it would render the resonator device, and thus the voltage controlled oscillator disclosed therein, inoperable.

The rejection of dependent claims 2-6 is moot inasmuch as claims 2-6 have been cancelled without prejudice.

Claims 7-20, being dependent upon allowable independent claim 1 as presently amended, are allowable for the same reasons as claim 1.

More particularly, claim 12 recites at least two passive devices; claim 13 recites at least five passive devices; and claim 14 recites at least two devices serially connected together. As described above, the Clark patent discloses only a single passive capacitive plate 103.

Claim 14 has additionally been amended to recite that each of the passive devices defines terminal ends and that the conductive lead associated therewith

extends between the terminal ends. This amendment does not introduce any new matter and is support in, for example, FIG. 7 and the description on page 9, lines 22-28.

Claim 15 has been amended in a manner similar to claim 14 and recites that each of the passive devices is a curvilinear portion of printed wiring terminating into opposed ends with the conductive lead extending therebetween. This amendment does not introduce any new matter and is supported in FIG. 7 and the description on page 12, lines 10-17.

The capacitive plate 103 of the device disclosed in the Clark patent is not curvilinear and includes only one conductive lead resonator strip 105 connected thereto.

Claim 19, as amended, recites that the package has a through-hole positioned above the conductive lead for focusing a laser beam into the hole and onto the conductive lead to sever the same.

This amendment does not introduce any new matter and is supported in FIG. 5, which depicts package/lid 164, and the description on page 14, lines 7-19.

FIGS. 2-4 of the Clark patent disclose only a substrate 111 with a plated through via 203, not a separate package or lid with a through-hole as recited in claim 19.

Independent claim 21 has been amended to more particularly recite that the circuit board and compliant material are two separate elements made of different materials and, more specifically, that the compliant material positioned between the circuit board and the resonator has a Young's Modulus lower than the Young's Modulus of the material of the circuit board.

The amendments do not introduce any new matter and are supported in, for example, page 15, lines 9-28 to page 16, lines 1-2.

Claim 21 is allowable for the same reasons as disclosed above with respect to claim 42 and incorporated herein by reference. As described above with respect to claim 42, the cited references disclose only resonator and integrated circuit substrates made of certain materials, and there is no disclosure of the use of a separate compliant material between a circuit board and a resonator for shock-absorbing purposes as recited in claim 21.

Claims 22-26, being dependent upon independent claim 21 as presently amended, are allowable for the same reasons as independent claim 21. More

specifically, and as described above, none of the cited references disclose or suggest the use of a compliant material between a circuit board and a resonator, let alone a compliant material composed of silicone (claim 22); a metal or metal alloy filling (claim 23); a silver-filled silicone (claim 24); having a Young's Modulus less than 1 GPa (claim 25); having a Young's Modulus less than .5 GPa (claim 26). The only disclosure in the Mucke reference is of an integrated circuit substrate made of silicon, not of a separate compliant silicone material between a circuit board and a resonator as in the present invention.

The rejection of dependent claims 30-38 and 41 is moot inasmuch as dependent claims 30-38 and 41 have been appropriately cancelled without prejudice.

Claims 39 and 40, being dependent upon independent claim 21, are allowable for the same reasons as independent claim 21.

In view of the above amendments and response, Applicants contend that the remaining pending claims are now in condition for allowance, and thus the allowance of claims 1, 11, 14-19, 21, 26, 39, 42, 43, 47, 48, and 49 and the passing of the case to issuance is now respectfully requested.

Respectfully submitted,

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CERTIFICATE OF MAILING

I, Joan C. Ramm, hereby certify that this Amendment and Response Under Rule 111 is being deposited with the United States Postal Service as first class mail, postage pre-paid, on May 31, 2006 in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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